CONSIGLIO NAZIONALE DELLE RICERCHE
ISTITUTO NAZIONALE DI OTTICA

AVVISO DI SEMINARIO

Il giorno giovedi 14 novembre 2013 alle ore 10,30

presso l'Area della Ricerca di Pisa

Aula 44, primo piano, Edificio "A"

Il Dr. ***Jorge Tovar***

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terrà un seminario sul tema:

CERIUM INCORPORATION EFFECT ON THE CHARACTERISTICS OF 1-D NANOSTRUCTURED SILICA MCM-41

In this study the synthesis of cerium modified 1-D nanostructured materials was carried out in an ultrasound radiation assisted hydrothermal process. Ultrasound radiation enhances cerium incorporation and particle dispersion. Four different Ce/Si molar ratios were prepared (0.02, 0.04, 0.06 and 0.08). All obtained samples were characterized using powder small and wide angle x-ray diffraction (SA-XRD, WA-XRD), Nitrogen adsorption-desoprtion, Fourier transform infrared spectroscopy (FT-IR), Diffuse reflectance UV-visible (UV-vis) spectroscopy and High resolution transmission electron microscopy (HR-TEM). According to the XRD results, as the amount of cerium increases the material crystalline features are reduced. Given the disparity between the Ce and Si atomic radius, a low Ce/Si ratio of 0.02 is enough to reduce the original material cristallinity to 38%, whereas the original hexagonal structure is still kept. At certain extent, the synthesis is able to incorporate cerium species into MCM-41 framework. Larger molar ratios can result in structure partial or total collapse. WA-XRD reveals weak diffractions peaks that belong to those of cubic cerium oxide. Ce/Si 0.04 and 0.06 ratios produce interesting materials that keep the hexagonal structure and could behave as cerium oxide. Unit cell parameter a_0 varies from 4.76 to 5.86nm, d_{100} spacing increases from 4.12nm to 5.07nm. Pore wall thickness estimated changes from 0.98 to 1.47nm. BET surface areas are as high as 827m^2/g. UV-vis spectroscopy makes evident the presence of tetra-coordinated cerium into the MCM-41 framework. These findings support the potential use of these synthesized materials as catalytic supports.

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